

PROCEEDINGS OF SPIE

Laser-based Micro- and Nanopackaging and Assembly VI

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Introduction

This conference series was established in 2002, under the name “Laser-Based Packaging in Microelectronics and Photonics.” In 2004, the conference was renamed as “Laser-Based Micro-Packaging.” In 2007, the conference was again renamed, this time as “Laser-based Micro- and Nanopackaging and Assembly (LBMP),” to reflect the relevance of nanoscale structures.

The LBMP conference brings together scientists from academic institutions and industry in order to provide a platform for mutual and fruitful discussions on application-oriented, cutting-edge research fields. The scope of relevant applications covers the fabrication of electronic, photonic, mechanical, chemical, biological, bio-active, and bio-compatible devices including MEMS/bio-MEMS, MOEMS, and OLED. Because of the strong economical demand, laser material processing is playing increasingly important roles in areas covered by the LBMP conferences, along with new “green technologies” such as photovoltaic and advanced energy storage systems. Leading designs and applications are progressively based on micro- and nanosystem technologies because of their novel and significantly improved physical, chemical, and biological properties and phenomena. Advanced laser-based micro- and nanopackaging and assembly is strongly demanded by high-tech industries for specialized prototypes and high-throughput devices with micro- and nanostructures to realize electronic, photonic, mechanical, fluidic, chemical, and biological functionalities. However, the realization of such devices or functional prototypes imposes new challenges for patterning, packaging, and assembly. Economic aspects of production processes are a critical part of the applications. Only interdisciplinary approaches with strong association among researchers from industry and academic institutes can overcome the barriers for transferring new technologies at research stage to commercial products.

Miniaturization of the functional devices and systems significantly increases the complexity of their design and fabrication. Due to the continuous increase in complexity of device structures, processing needs for wide varieties of materials is leading to new applications and research fields but at the same time imposing new challenges for appropriate assembly and packaging technologies. The laser-induced modification of material properties on micro- or nanoscale becomes more and more important in some applications (e.g. photovoltaic) where undesired material and surface modifications such as chemical or heat-affected structural changes must be avoided. Meanwhile, an increase in production costs or a significant change of established production lines can be limiting factors. Therefore, both, high-performance new products and innovations for high-efficiency/high-throughput manufacturing and assembly technologies are the focus of the conference.

The conference LBMP-VI was held on 24–26 January 2012 as part of LASE at Photonics West in San Francisco, California. LBMP-VI comprised 32 presentations which were presented by speakers from France, UK, Italy, Japan, Russia, Germany, and the United States. Presentations represented a number of topics including: laser welding and joining, ultrafast laser, high-power GaN violet diode laser, advanced laser-assisted deposition and synthesis, laser micro- and nanostructuring and modification, micro- and nanomachining, batteries and thin films, direct-write processing and surface modification, and photovoltaics. The photovoltaics session was jointly organized with Conference 8243: Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XVII.

We would like to express our deepest gratitude to the program committee members and the SPIE technical staff for their great efforts during the planning and organization of LBMP-VI. We would also like to thank the invited speakers and presenters of the contributed papers for their contribution to the success of the conference. All the manuscripts were peer-reviewed in order to publish high-quality conference proceedings.

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